R E P O R T R E S U M E S

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EVALUATION OF SCIENCE INSTRUCTION IN SPANISH FOR STUDENTS OF SPANISH SPEAKING BACKGROUND--STEPS IN IMPLEMENTING EXPERIMENTAL PROJECT (FOR SCHOOL INFORMATION).

BY- LORETAN, JOSEPH O. AND OTHERS
NEW YORK CITY BOARD OF EDUCATION, BROOKLYN, N.Y.

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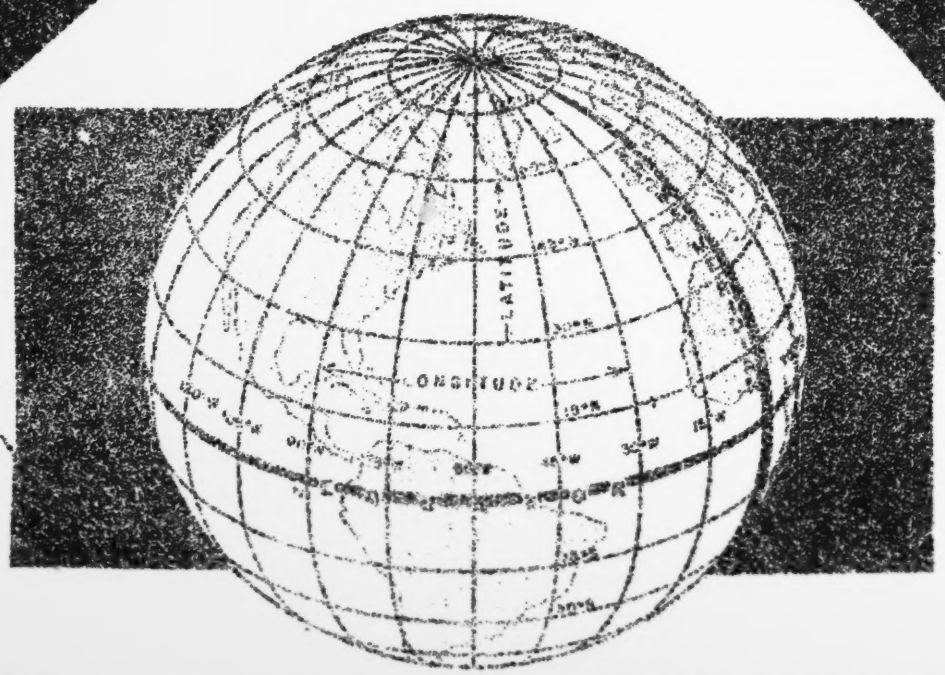
A PROJECT WHOSE PURPOSES WERE TO FOSTER BILINGUALISM, FORESTALL ANTICIPATED DIFFICULTIES IN SCIENCE, AND PROVIDE THE MOTIVATION AND COURSE REQUIREMENTS ESSENTIAL FOR SUCCESS IN HIGH SCHOOL IS DESCRIBED AND ASSESSED IN THIS REPORT. TWO SEVENTH-GRADE CLASSES OF SIMILAR AGE, LANGUAGE BACKGROUND, AND ABILITIES WERE GIVEN THE SAME OR EQUIVALENT PROGRAM IN ALL RESPECTS EXCEPT THREE. THE EXPERIMENTAL GROUP RECEIVED THEIR SCIENCE INSTRUCTION IN SPANISH, USED A SPANISH TEXT, AND WERE GIVEN A COURSE IN THE SPANISH LANGUAGE. AT THE END OF THE EXPERIMENT, BOTH GROUPS WERE MEASURED FOR PROGRESS IN SPANISH, SCIENCE, ENGLISH, AND STUDENT ATTITUDES. THE RESULTS INDICATED THAT ACHIEVEMENT IN SCIENCE AND SPANISH WAS IMPROVED, AND THAT THE PROGRAM MOTIVATED THE STUDENTS, HELPED IMPROVE THEIR SELF-IMAGE AND APPRECIATION FOR THEIR HISPANIC CULTURE, AND BROUGHT ABOUT A DECREASE IN ANXIETY. INCLUDED AS PART OF THIS REPORT ARE A SAMPLE REVIEW PHYSICS TEST IN SPANISH; AND A DEPTH INTERVIEW WITH A SPANISH-SCIENCE TEACHER. (OC)

ED012559

SCIENCE



SPANISH

BOARD OF EDUCATION OF THE CITY OF NEW YORK

Dr. Joseph O. Loretan, Principal Investigator
Dr. Samuel D. Mc Clelland, Co-Investigator

Mr. Philip Bolger, Research
Dr. Carmen Sanguinetti, Curriculum

Dr. Arnold Raisner, Director

PROGRAM

FL 000 470

BOARD OF EDUCATION OF THE CITY OF NEW YORK
JOSEPH O. LORETAN, Deputy Superintendent of Schools
DIVISION OF RESEARCH AND EVALUATION
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EVALUATION OF SCIENCE INSTRUCTION IN SPANISH FOR STUDENTS OF SPANISH SPEAKING BACKGROUND

STEPS IN IMPLEMENTING EXPERIMENTAL PROJECT (FOR SCHOOL INFORMATION)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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ARNOLD RAISNER
Project Director

PN 22-349

April 13, 1964

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Background

In recent years we have had little increase in the total number of Puerto Rican residents in New York City. Census figures show us that the peak period of Puerto Rican in-migration took place during 1953 and 1954. Of the 114,000 pupils of Puerto Rican background presently in the elementary schools, 55,000 are fluent in English and the balance are in various stages approaching fluency (transition period). These figures have clear educational implications.

The prospects for academic success for students with Spanish-speaking background are not as promising as those of their mainland counterparts. Puerto Rican students in New York City who recently acquired initial skills in the English language are encumbered by a deficiency in academic areas aggravated during their period of integration and adjustment. This is especially true in scientific fields since the vocabulary is specialized, concepts are difficult, and both the ideas and terminology are of rare occurrence in English instruction and in life outside the school. Continued avoidance of the Spanish language in the science area could contribute to the difficulties of the student with normal mental ability.

The design of the present study calls for the following program arrangements for the experimental class (students of Spanish-speaking background):

a. The new course of study in science will be taught in Spanish. In the designated schools bi-lingual teachers will serve as instructors.

b. Spanish, as a foreign language, will be taught in accordance with a modified program to be outlined by the Director of Foreign Languages.

c. The experimental class and the control class will continue their course of study for a period of three years.

The following rationale for the indicated program is based upon a long view of the educational needs of the Puerto Rican student.

The high school academic course of study is, to a large extent, a continuation and extension of the course work initiated in the junior high schools. The exclusion of foreign language or science from a student's junior high school studies minimizes his prospects for an academic future. Since the continuum of academic subject sequences (in science and foreign language) begins in the junior high school, we cannot postpone until high school the meeting of the subject content in these areas. This is particularly true for bright students of Spanish-speaking background.

Knowledge of the Spanish language is an academic asset to the high school student. Continued neglect of Spanish results in the forgetting of the language or, at best, in the surrender of the academic aspects (reading and writing) which define the bi-lingual student.

In addition to providing for science-Spanish classes, the design of the present study calls for a three year course in Spanish in the junior high school. Skills in speaking Spanish are to be reenforced in the science class.

Cooperative procedures between the science teacher and the Spanish teacher will be established. These teachers may be scheduled for common preparation periods so that vocabulary lists and direct translations of science materials may be reviewed.

Success in Spanish by the students in the experimental class would place them in a position of "advanced" academic standing so that subject deficiencies in other areas, if they exist, may be handled within the allotted time-blocks of the high school academic program. For example, a student who receives three years of regents credit for foreign language study may be allowed greater latitude for subject selection within the high school academic course of study.

The studied avoidance of the use of Spanish in the classroom may have distinct undesirable consequences. Psychologically, the student is led to place little value upon his Spanish background or even to be ashamed of it. Knowledge of the Spanish language, an attainment that would be adjudged a great asset for the New York City student of English-speaking background, is considered to be a detriment and a stigma for the Puerto Rican student.

The program is designed to foster true bi-lingualism, to forestall anticipated difficulties in science and to provide the motivation and course requirements necessary for advanced standing in the high school. Students who speak both English and Spanish are given the opportunity to develop their bi-lingual talents while extending their prospects for academic success in science.

Specific Objectives

The objectives of the present project are to achieve the following aims for a sample population of New York City students of Spanish background.

a. To increase the students' knowledge of Spanish language, literature and culture through classes taught by licensed teachers of Spanish.

b. To increase the students' knowledge of English language, literature and culture through classes taught by licensed teachers of English.

c. To increase the students' knowledge of science by having them taught by bilingual teachers of science or by special Spanish-orientated methods.

d. To raise the students' self-image, morale and aspirations by nurturing their pride in their Spanish origins.

e. To create in the student an appreciation of the fact that American democracy does not require sterile cultural uniformity.

f. To measure and evaluate the levels of proficiency attained in Spanish and in science.

g. To ascertain status and changes in attitudes, emotions, motivation, and other personality factors.

h. To compare the attainments of this sample population with those of control groups taught by present methods.

General Procedures

1. Selection of Pupils

The experimental class will consist of approximately 35 seventh grade students who meet the criteria indicated bwlow. The data used for composing the class may be obtained from the feeder school articulation cards. Additional information which may be necessary in the placement of specific students may be obtained by contacting the feeding elementary school. The criteria indicated below are flexible and should be applied within the limitations of the individual school.

Criteria	Ability Level
6th Grade Reading Level (English)	4.0 - 5.0
6th Grade Level (New York City Test of Mathematical Concepts)	4.0 - 5.0
Command of Spanish	Fair - Good

The control class will be composed in a similar manner. This class will not be programmed for Spanish (see schedule below).

2. Programming for Experimental Groups

Course Title	Experimental Class	Control Class
New Science Course in Spanish	YES 4 times a week grades 7 & 8 5 times a week grade 9	NO
New Science Course in English	NO	YES 4 times a week grades 7 & 8 5 times a week grade 9
Spanish Language Study	YES Grades 7,8,9	NO

An alternate method of class organization would involve the assignment of the 35 designated experimental students to two or three home room classes. These classes may be programmed in parallel for science and Spanish so that the experimental group is together during these periods only. Similarly, the students in the control group may be identified and then assigned to different classes. This procedure may avoid the "segregation" of Puerto Rican students and provide greater leeway in programming while assisting in maintaining normal registers in all classes despite pupil mobility.

The Junior High School Division will provide special assistance for the Spanish and science teachers. This help will include specific outlines of the courses to be followed, suggested lesson plans, translated materials and tests for evaluation of student progress.

3. Assignment of Teachers

Teachers assigned to the science and Spanish classes should be licensed in their respective fields. The science teacher who is most proficient in the use of Spanish should be selected for the project. In those schools in which the science teacher of the experimental class is not fluent in Spanish, it is recommended that the science and Spanish teacher be scheduled for at least two of their unassigned periods at a common time so that they may plan jointly when necessary. Cooperative procedures between the science and the Spanish teachers will facilitate the integration of the two areas.

4. Ordering Texts and Materials

Schools involved in the project will be asked to order recommended texts under the NDEA Title III project. Use of project funds will in no way diminish the normal school allotment. Standard forms for ordering books together with recommended lists will be given to each school. Texts in science and Spanish which are used in regular classes should also be given to the experimental class. All other books and materials will be used to augment rather than to displace regular instructional materials.

5. Contacting Parents

Parents of the selected students should be informed of the special advantages which their children will derive. They should become familiar with the aims and procedures of the program together with the method used to select students for special class placement. It is suggested that an initial letter be sent to the parents of the pupils involved in the experiment.

6. Mobility of Pupils

The "mobility" of pupils introduces the problem of replacing children who leave the experimental class. Without replacement the registers of these classes will diminish significantly. In the "parallel programming" plan the register in the Spanish language class will diminish while all other classes retain their normal number.

Since long term (over two years) residents enter the seventh grade with a wide range of abilities in the use of the Spanish language, classroom instructional grouping and procedures must reflect these differences. In addition, initial screening of students for the experimental class may narrow the range of students' ability in Spanish. In some schools it may be valuable to ask the N.E. Coordinator to visit the Feeding school in order to identify apt candidates for the experimental class.

A student who enters the school during the second year of the experiment may still be placed in the experimental class contingent upon passing a brief examination which will be supplied by us. These students, after being admitted to the class, will be supplied with review material for compensatory independent study. This study material will be sent to the Spanish teacher by the Foreign Language Office.

7. Project Evaluation

Tests for measuring pupil progress in the areas of Spanish, science, English and student attitude will be supplied through the Bureau of Educational Research. The burden of rating and tabulating results will not rest upon the school. The facilities of the Bureau of Educational Research will be used for this purpose.

8. Project Supervision

Dr. Carmen Sanguinetti who helped to initiate many of the projects in the pilot program of 1963 will continue to provide direction and assistance to teachers in the experimental schools. Dr. Arnold Raisner, Project Director, will coordinate and direct the entire experimental program.

SCIENCE-SPANISH RESEARCH PROGRAM
New York City - Board of Education
130 West 55th Street
New York 19, N. Y.

Depth Interview with Alejandro Rodriguez, Science-Spanish Teacher, Thomas Knowlton Junior High School (JHS 52X) conducted by Phillip Bolger, Research Associate.

Re: Total Effect of Science-Spanish Program - March 10, 1966

1. Effect of program upon students and student effect upon others:

   a) Language retention in Spanish does not hurt English.

   b) Parents need orientation initially; parents want the program; some parents have moved and later complained that the new school does not have the program.

   c) Parents now identify Mr. Rodriguez as the man for Spanish-speaking people to see at the school regarding any problem. He must funnel them to the NE Coordinator. Many parents come to Mr. Rodriguez with problems concerning correct usage of English, since they have become more involved with the total educational program through their children.

   d) The program has been a definite positive factor in improving student behavior and attendance. In no case has any student in the class been involved in school trouble. Their attendance rate compared to the control class is exceptional. This has resulted in reducing the work load in guidance offices. Practically every student in the experimental class received very good ratings by other teachers on the report cards concerning personal and social habits.

   e) The program as now conducted with below average pupils who were just showing signs of slipping has been successful according to Mr. Rodriguez's observations concerning the aims of improving student additude, achievement and aspirations. However, it was also theorized that such a program as this should also be conducted with the above average or average student for different reasons:

      1. Leadership for the Puerto Rican community comes from the average or above average group.

      2. Unfortunately, too many of these people do not associate with the community once they have achieved success.

      3. Perhaps if this group continued formal use of the language, or saw that the language was given a prestige position in the schools they would, by participating in these classes, learn to respect their heritage and maintain an affinity with the problems of the Spanish-speaking community.

4. Distributive guidance aspects - the brighter child will probably be the one who will be in a career position to contribute to our efforts in the world. If he retains a knowledge of the language it would be an assist to the government in Latin-American affairs.

5. Learning a scientific vocabulary in a foreign language is an asset to the child giving him a saleable skill, as well as an asset to the world community. It will probably be the upper group, academically, who will become professional scientists.

II. A bilingual program should be started in the sixth rather than the seventh grade:

a) His school is now on the 6, 7, 8 arrangement.

b) By 7th grade there is resistance to taking a course using formal Spanish; once in the program the students react positively, but initial orientation is necessary.

c) During sixth grade the children still have a 50/50 usage of Spanish and English at home and outside school; sixth graders in school frequently use Spanish, among themselves, but rarely does this occur among seventh graders. By seventh grade, students even drop the use of Spanish at home and outside school. If we wish to retain the Spanish language ability in them, the sixth grade seems a better point at which to initiate a program. It is not considered a foreign language by the children.

III. <u>Teacher</u>

a) The program requires on the overage over the year at least twice as much preparation (e.g. typing a test in Spanish and English; class discussion questions in English and Spanish, charts, diagrams, dictionary work, etc.).

b) Be careful in assigning classes. If teacher is given a single level he would not require too much preparation time; but in some cases the teachers must prepare for classes in the seventh, eighth and ninth grade. So many preparations plus a bilingual class present a time problem.

c) Most likely a bilingual instructor would be assigned all the bilingual classes at each level. With a laboratory assistant and permission to be flexible in implementing the now difficult curriculum the amount of preparation would not be too much. This is to be considered since it is unlikely that they would have three different bilingual teachers in one school; one bilingual teacher would probably handle all such classes.

d) Under an arrangement such as the above a bilingual teacher could teach all 6th, 7th and 8th grade bilingual classes (18 periods) perhaps have two orientation classes of 2 periods each (4 periods).

IV. Licensing

a) A fluent Spanish-speaking teacher (which this program attempts to secure) is probably more capable in Spanish than in English; few people are equilingual.

b) If staff must pass current Board of Examiners standards for English many otherwise capable teachers will not get through. They will probably have learned English through Spanish and at best their English will always be hesitant with a certain amount of transference interference.

V. Other observations and comments:

a) Do students polarize toward you because you are Puerto Rican or because you use the Spanish language?

Students polarize toward any teacher in the school who uses Spanish to any extent, regardless of the ethnic character.

b) The text book from Spain must only be used as reference for outside reading or selected class reading. The Puerto Rican books are better for class.

Prepared by:

Phillip Bolger
Research Associate
Bureau of Educational Research

Summary of Individual Findings

1. Science - 7th Grade	Significant Difference
2. Science - 8th Grade	Significant Difference
3. Spanish - 7th Grade	Significant Difference
4. English Reading - 6th Grade to 8th Grade	No Difference
5. Report Card Marks (Achievement)	
Science - 8th Grade	Significant Difference
English - 8th Grade	No Difference
Social Studies	No Difference
Mathematics	No Difference
6. Report Card Ratings (Personal Social)	
Effort	Significant Difference
Reliability	Significant Difference
Conduct	No Difference
Self-Control	No Difference
7. Attendance	No Difference
8. General Anxiety - two years	Significant Decrease
9. Cultural Retention	Significant Difference

General Summary

A. The program is successful in the achievement areas of science and Spanish. in motivating students to try harder and to conform to school society. in decreasing anxiety, and in promoting an affinity for Hispanic-culture (self-image).

B. The program will neither impair nor improve reading ability in English or general English achievement.

C. It cannot be expected to improve a student's achievement in the other, non-bilingual achievement areas. It cannot be expected to improve conduct or self-control.

Application

These are the findings when the schools are considered in general. They represent what would most frequently happen if a similar program was inaugurated in a large number of schools. Any, or all, of these findings might be altered in the case of an individual school; in most cases, however, the findings will be repeated. The program can be used:

(1) as an instructional program to improve achievement in science or Spanish

(2) as a guidance program to motivate students, improve self-image and decrease anxiety

NEW YORK CITY-BOARD OF EDUCATION
SCIENCE-SPANISH EXPERIMENT
JUNIOR HIG H SCHOOL DIVISION

Sección Física Grado 8 Pág. Notas

PREGUNTAS DE REPASO

Materia y Energía

Direcciones (1-30): En la línea a la izquierda de cada oración, escribe la letra de la mejor contestación.

1. La presión del aire al nivel del mar generalmente es más o menos

   a) 1 libra por pulgada cuadrada
   b) 15 libras por pulgada cuadrada
   c) 24 libras por pulgada cuadrada
   d) 30 libras por pulgada cuadrada
   e) cero libras por pulgada cuadrada

2. Las raquetas de nieve ayudan a caminar sobre la nieve porque

   a) el peso de la persona está concentrado
   b) el peso de la persona esta distribuído sobre un área mayor
   c) las raquetas son livianas
   d) la nieve puede pasar por el entretejido
   e) la nieve es liviana

3. La presión que un líquido ejerce depende de

   a) la densidad del líquido solamente
   b) la profundidad del líquido solamente
   c) la profundidad y densidad del líquido
   d) la altura sobre el nivel del mar
   e) la presión del aire solamente

4. Si un niño que pesa loo libras se sienta a 3 pies del fulcro de un balancín (columpio de tabla), a qué distancia del fulcro deberá sentarse una niña que pesa 50 libras para balancear el columpio?

   a) 3 pies b) 15 pies

PREGUNTAS DE REPASO

Materia y Energía

(Continuación)

Sección Física Grado 8 Pág.___ Notas

4. continuacion

c) 7 pies
d) 4 pies
e) 6 pies

5. El densímetro se usa para medir

a) el volumen de agua
b) la humedad del aire
c) la profundidad del agua
d) la densidad del agua
e) la densidad de los líquidos

6. Un objeto que se sumerge en agua

a) puede flotar en keroseno
b) puede flotar en alcohol
c) puede flotar en mercurio
d) tiene una densidad menor de 1 gm./cm.^{3}

7. Una pelota se tira hacia arriba . Según sube gana en

a) masa
b) energía potencial
c) energía cinética
d) peso
e) aceleración

8. Todas las cantidades vectoriales describen

a) cantidad y dirección
b) cantidad y velocidad
c) velocidad y dirección
d) fuerza y dirección
e) fuerza y velocidad

9. Una resultante es un vector formado por la combinación de dos o más

a) triángulos
b) paralelogramas
c) equilibrantes
d) masas
e) vectores

PREGUNTAS DE REPASO

Materia y Energía

(Continuación)

Sección Física Grado 8 Pág. Notas

10. Para determinar la ventaja mecánica de una máquina

a) se divide el esfuerzo por la resistencia
b) se multiplica el esfuerzo por la resistencia
c) se divide la resistencia por el esfuerzo
d) se resta el esfuerzo de la resistencia
e) se divide la resistencia por el peso

11. El centro de gravedad de un metro (bara de medir) está cerca del punto que marca

a) 30 cm.
b) 40 cm.
d) 50 cm.
d) 60 cm.
e) 70 cm.

12. Si dos fuerzas actúan en la misma dirección o en direcciones opuestas, las fuerzas se dicen que

a) están en equilibrio
b) son estables
c) son inestables
d) son paralelas
e) están balanceadas

13. La energía acumulada debido a la posición de un cuerpo se clasifica como

a) cinética
b) atómica
c) potencial
d) radiante
e) nuclear

14. La energía es

a) trabajo
b) una fuerza
c) potencia
d) habilidad para hacer trabajo
e) movimiento

PREGUNTAS DE REPASO

Materia y Energía

(Continuación)

Sección Física Grado 8 Pág.___ Notas

15. Toda la cantidad de materia (masa) mas la energía en el universo

a) está aumentando rápidamente
b) está disminuyendo rápidamente
c) está disminuyendo lentamente
d) se mantiene igual siempre
e) está aumentando lentamente

16. La presión se expresa en

a) gramos por cent ímetro
b) gramos de fuerza por centímetro cuadrado
c) libras por pie cúbico
d) pies-libras
e) libras por pie

17. Una importante propiedad del líquido usado en la prensa hidráulica es su

a) elasticidad
b) baja densidad
c) incompresibilidad
d) alta gravedad específica
e) inercia

18. La densidad de agua es

a) 10 g/cc
b) 62.5 g/cc
c) 1 g/cc
d) 212 g/cc
e) 32g/cc

19. La máquina de un avión tirando con una fuerza' de 8 toneladas, y un viento trasero empujando el avión en la misma dirección con una fuerza de 10 toneladas proveerá una fuerza resultante de

a) 7 toneladas
b) 8 toneladas
c) 10 toneladas
d) 18 toneladas
e) 80 toneladas

PREGUNTAS DE REPASO

Materia y Energía

(Continuación)

Sección Física Grado 8 Pág. Notas

20. Para aumentar la ventaja mecánica de una palanca debemos

a) poner el fulcro más cerca de la resistencia
b) acortar el brazo de potencia
c) aumentar el brazo de resistencia
d) aplicar una potencia mayor
e) cambiar la resistencia

21. Una pirámide descansando en su base es un ejemplo de un cuerpo que

a) es estable
b) es inestable
c) es neutral
d) es pesado arriba
e) no está en equilibrio

22. Una máquina puede multiplicar

a) trabajo
b) energía
c) fuerza
d) inercia
e) fricción

23. Si la distancia entre un satélite y la tierra fuera el doble, la fuerza gravitacional entre los dos cuerpos sería

a) la mitad
b) 2 veces más grande
c) la cuarta parte
d) 4 veces más grande
e) la misma que antes

24. Una longitud de 5 pies es aproximadamente igual a

a) 150 milímetros
b) 150 centímetros
c) 150 octómetros
d) 150 metros
e) 150 kilómetros

PREGUNTAS DE REPASO

Materia y Energía

(Continuación)

Sección Física Grado 8 Pág.___ Notas

25. En cierta máquina el brazo potencia mide 6 pies y el brazo resistencia mide 2 pies. La ventaja mecánica es

a) 12
b) 8
c) 6
d) 4
e) 3

Direcciones (26-41): En las oraciones que siguen, suple las palabras que mejor las completan.

26. Un hombre ejerce una fuerza de 75 lbs. sobre un carro que pesa 3,500 lbs. y lo mueve una distancia de 10 pies. El hombre efectúa _____ pies-libras de trabajo.

27. Se hace trabajo cuando una fuerza aplicada resulta en _____.

28. La energía que un cuerpo posee debido a su posición se denomina energía _____.

29. Si una piedra pesa 33 gramos en aire y 22 gramos sumergida en agua, la densidad de la piedra es _____.

30. Si un pedazo de aluminio y un pedazo de plomo pierden el mismo peso cuando están sumergidos en agua, el _____ de ambos pedazos es igual.

PREGUNTAS DE REPASO

Materia y Energía

(Continuación)

Sección Fisica Grado 8 Pág. Notas

31. Una balsa y su carga pesan 250 lbs. La balsa cargada flota y desplaza _____ libras de agua salada.
32. La ley de flotación fué formulada por_____.
33. Un plano inclinado tiene una longitud de 20 pies y una altura de 5 pies. Sin considerar la fricción, la fuerza que se necesita para mover un camión de 2,000 lbs. rampa arriba es _____ lbs.
34. El calor, la luz y la electricidad son formas de _____.
35. La energía que poseen los cuerpos en movimiento se denomina energía _____.
36. Un tablón uniforme que pesa 2 lbs. y tiene 6 pies de longitud descansa en el piso. La fuerza que se requiere para levantar un extremo es _____ lbs.
37. Un resorte de 10 cm. de largo se estira 2 cm. cuando se cuelga de él una masa de 1000 gm. Si se añade una masa de 500 g. la longitud del resorte será entonces_____cm.
38. El punto en el cual el peso de un cuerpo parece estar concentrado se considera su _____.

PREGUNTAS DE REPASO

Materia y Energía

(Continuación)

Sección Física Grado 8 Pág.____ Notas____

39. Tres fuerzas actúan sobre un cuerpo: 19 lbs. este, 15 lbs., este y 5 lbs. oeste. La resultante es _____este.

40. El efecto rotatorio de una fuerza se llama _____.

41. Una fuerza que puede substituirse por dos fuerzas concurrentes se llama _____.

Direcciones (42-50): En el espacio a la izquierda de cada oración escribe la palabra SÍ si la oración está correcta. Si no está correcta escribe la palabra NO .

42. En un sistema de poleas la fuerza rendida es menos que la potencia.

43. Cuando tres fuerzas están en equilibrio, cualquiera de ellas es la resultante de las otras dos.

44. Una palanca tiene la potencia y la resistencia a la misma distancia del fulcro. Si la potencia se mueve 3 pies, la resistencia se mueve 3 pies.

45. Un cuerpo en movimiento tiende a mantenerse en movimiento debido al momento.

PREGUNTAS DE REPASO

Materia y Energía

(Continuación)

Sección Física Grado 8 Pág.___ Notas

46. La fuerza que equilibria dos o más fuerzas se llama la resultante.
47. El automóvil moderno es más estable porque tiene una base baja.
48. La ventaja mecánica de una polea sencilla y fija es menos de uno.
49. Un bloque de azufre que pesa 600g. tiene 15cm. de longitud, 10 cm. de ancho, y 2cm. de espesor. Su densidad es 600 g./cc.
50. El bloque descrito en la pregunta anterior se sumerge en agua.

Contesta las siguientes preguntas en el papel que proveerá el maestro.

1. Da una breve explicacion científica para cualesquiera cinco de los siguientes hechos científicos:
   a) Un objeto pesa más al nivel del mar que en el Monte Everest.
   b) Un objeto puede hundirse en agua fresca y flotar en agua del mar.
   c) Una niña que pesa 100 lbs. y lleva zapatos de taco alto puede ejercer mas presión contra el piso que un hombre que pesa 200 lbs.

PREGUNTAS DE REPASO

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d) Un barco de acero puede flotar.

e) Es imposible construir una máquina de movimiento perpétuo.

f) Dos objetos del mismo tamaño pueden tener distintos pesos.

2. Escribe una de las experiencias de laboratorio indicadas abajo. En la descripción incluye los siguientes:

a) Propósito

b) Lista de materiales

c) Procedimiento

d) Observaciones

e) Lista de conclusiones

Lista de Experiencias

- Comparación del trabajo motor y el trabajo resistente en un sistema de poleas.
- Estudio de la Ley de Hooke
- Paralelogramo de fuerzas.
- Ley de momentos.
- Determinación de densidades
- Principio de Arquímides

Translated and adapted by:
Carmen S. Sanguinetti
Sci.-Span. Proj. Superv.
J.H.S. Division

AR:dt